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EXAMINER

COLAN, GIOVANNA B

ART UNIT	PAPER NUMBER
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2162

DATE MAILED: 08/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/673,651	CHEN ET AL.	
	Examiner	Art Unit	
	Giovanna Colan	2162	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 May 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) See Continuation Sheet is/are pending in the application.
- 4a) Of the above claim(s) 5, 12, 19, 26, 33, 39 and 48 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 4, 6 - 11, 13 - 18, 20 - 25, 27 - 32, 34 - 38, 40 - 47, and 49 - 50 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Continuation of Disposition of Claims: Claims pending in the application are 1 - 4, 6 - 11, 13 - 18, 20 - 25, 27 - 32, 34 - 38, 40 - 47, and 49 - 50 .

DETAILED ACTION

1. This action is responsive to the Amendment filed on 05/26/2006.
2. Claims 1, 7, 9, 14, 16, 23, 28, 30, 35, 37, 42, 44, and 49 were amended. Claims 5, 12, 19, 26, 33, 39, and 48 were canceled. No claims were added.
3. This action is made Final.
4. Claims 1 – 4, 6 – 11, 13 – 18, 20 – 25, 27 – 32, 34 – 38, 40 – 47, and 49 – 50 are pending in this application.
5. Applicant's arguments filed on 05/26/2006 have been fully considered but they are not persuasive.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1 – 4, 6, 8 – 11, 13, 15 – 18, 20, 22 – 25, 27, 29, 30 – 32, 34, 36 – 38, 40 – 41, 43 – 47, and 50 are rejected under 35 U.S.C. 102(b) as being anticipated by Reiner et al. (Reiner hereinafter) (US Patent No. 6,289,334 B1, issued: September 11, 2001).

Regarding Claim 1, Reiner discloses a method for maintaining and using a query index, wherein queries within said query index have predicate intervals (Col. 10, lines 56 – 61, Reiner), said method comprising:

defining groups of virtual construct intervals (Col. 2 and 8, lines 65 – 67 and 37 – 40; respectively, Reiner); and

inserting each of said predicate intervals into at least one of said groups of said virtual construct intervals (Col. 9, lines 12 – 13 and 27 – 28, Reiner)

wherein all of said groups of said virtual construct intervals within said query index have the same pattern of different sized of virtual construct intervals (Col. 4 and 25, lines 34 – 37 and 39 – 40; respectively, Reiner).

Regarding Claim 2, Reiner discloses a method, wherein each of said groups of virtual construct intervals is adapted to hold multiple predicate intervals, and

wherein said groups of virtual construct intervals have uniform lengths (Col. 25, lines 44 – 47, Reiner), and

wherein said predicate intervals have non-uniform lengths (Col. 25, lines 39 – 40, Reiner).

Regarding Claim 3, Reiner discloses a method, further comprising maintaining locations of said predicate intervals within said groups of virtual construct intervals using a predicate ID bitmap vector (Col. 63, lines 36 – 38, Reiner¹).

Regarding Claim 4, Reiner discloses a method, wherein said process of defining said groups of virtual construct intervals comprises beginning all virtual construct intervals in a group of virtual construct intervals at the same attribute value (Col. 10, lines 50 – 55, Reiner²) and ending said virtual construct intervals in said group of virtual construct intervals at different attribute values (Col. 9, lines 17 – 28, Reiner³).

Regarding Claim 6, Reiner discloses a method, wherein said process of inserting said predicate intervals into said virtual construct intervals, comprises inserting said predicate interval into the same sized virtual construct interval (Col. 13, lines 55 – 57, Reiner⁴).

Regarding Claim 8, Reiner discloses a method, wherein event values of said predicate intervals are aligned with the same event values of said virtual construct

¹ Examiner interprets the pointer to the bitmap as an ID bitmap vector claimed. Reiner further discloses that this pointer is used to indicate which buffers are full. This implies the step of locating.

² Wherein same key value corresponds to same attribute value claimed. In addition, the step of simultaneously indexing in accord to the same key value corresponds to beginning the predicates at the same attribute value claimed.

³ The two queries, before insertion and after insertion of predicates (disclosed by Reiner), begin with the same attribute values, such as, "SELECT name". Regarding the same citation, Reiner discloses ending the two queries at different attribute values, such as, "WHERE department" and "employee.rowid<0.0.2"

⁴ Wherein examiner interprets the step of appending partition-matching predicates as a step of inserting predicate intervals into the same sized virtual construct claimed. In other words, matching the partitions implies matching the size.

intervals, such that the same event values of multiple predicate intervals are inserted into the same event value within virtual construct interval (Col. 9, lines 36 – 39, Reiner⁵).

Regarding Claim 9, Reiner discloses a method for maintaining and using a query index, wherein queries within said query index have predicate intervals, said method comprising:

defining groups of virtual construct intervals (Col. 2 and 8, lines 65 – 67 and 37 – 40; respectively, Reiner); and

inserting each of said predicate intervals into at least one of said groups of said virtual construct intervals (Col. 9, lines 12 – 13 and 27 – 28, Reiner),

wherein each of said groups of virtual construct intervals is adapted to hold multiple predicate intervals (Col. 2, lines 66 – 67, Reiner),

wherein all of said groups of said virtual construct intervals within said query index have the same pattern of different sized of virtual construct intervals (Col. 4 and 25, lines 34 – 37 and 39 – 40; respectively, Reiner),

wherein said groups of virtual construct intervals have uniform lengths (Col. 25, lines 44 – 47, Reiner), and

wherein said predicate intervals have non-uniform lengths (Col. 25, lines 39 – 40, Reiner).

⁵ Wherein examiner interprets the step of aligning with the same event values as the step of appending a predicate for matching records claimed.

Regarding Claim 10, Reiner discloses a method, further comprising maintaining locations of said predicate intervals within said groups of virtual construct intervals using a predicate ID bitmap vector (Col. 63, lines 36 – 38, Reiner⁶).

Regarding Claim 11, Reiner discloses a method, wherein said process of defining said groups of virtual construct intervals comprises beginning all virtual construct intervals in a group of virtual construct intervals at the same attribute value (Col. 10, lines 50 – 55, Reiner⁷) and ending said virtual construct intervals in said group of virtual construct intervals at different attribute values (Col. 9, lines 17 – 28, Reiner⁸).

Regarding Claim 13, Reiner discloses a method, wherein said process of inserting said predicate intervals into said virtual construct intervals, comprises inserting said predicate interval into the same sized virtual construct interval (Col. 13, lines 55 – 57, Reiner⁹).

Regarding Claim 15, Reiner discloses a method, wherein event values of said predicate intervals are aligned with the same event values of said virtual construct

⁶ Examiner interprets the pointer to the bitmap as an ID bitmap vector claimed. Reiner further discloses that this pointer is used to indicate which buffers are full. This implies the step of locating.

⁷ Wherein same key value corresponds to same attribute value claimed. In addition, the step of simultaneously indexing in accord to the same key value corresponds to beginning the predicates at the same attribute value claimed.

⁸ The two queries, before insertion and after insertion of predicates (disclosed by Reiner), begin with the same attribute values, such as, "SELECT name". Regarding the same citation, Reiner discloses ending the two queries at different attribute values, such as, "WHERE department" and "employee.rowid<0.0.2"

⁹ Wherein examiner interprets the step of appending partition-matching predicates as a step of inserting predicate intervals into the same sized virtual construct claimed. In other words, matching the partitions implies matching the size.

intervals, such that the same event values of multiple predicate intervals are inserted into the same event value within virtual construct interval (Col. 9, lines 36 – 39, Reiner¹⁰).

Regarding Claim 16, Reiner discloses a method for maintaining and using a query index, wherein queries within said query index have predicate intervals, said method comprising:

defining groups of virtual construct intervals (Col. 2 and 8, lines 65 – 67 and 37 – 40; respectively, Reiner); and

inserting each of said predicate intervals into at least one of said groups of said virtual construct intervals (Col. 9, lines 12 – 13 and 27 – 28, Reiner),

wherein all of said groups of said virtual construct intervals within said query index have the same pattern of different sized of virtual construct intervals (Col. 4 and 25, lines 34 – 37 and 39 – 40; respectively, Reiner),

wherein each of said groups of virtual construct intervals is adapted to hold multiple predicate intervals (Col. 2, lines 66 – 67, Reiner), and

wherein each of said groups of virtual construct intervals covers a unique group of event values (Col.44, lines 1 – 2 and 7 – 10, Reiner), and wherein said inserting of said predicate values comprises inserting said predicate intervals only into said

¹⁰ Wherein examiner interprets the step of aligning with the same event values as the step of appending a predicate for matching records claimed.

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construct intervals that have corresponding event values (Col. 13, lines 55 – 57, Reiner¹¹).

Regarding Claim 17, Reiner discloses a method, further comprising maintaining locations of said predicate intervals within said groups of virtual construct intervals using a predicate ID bitmap vector (Col. 63, lines 36 – 38, Reiner¹²).

Regarding Claim 18, Reiner discloses a method, wherein said process of defining said groups of virtual construct intervals comprises beginning all virtual construct intervals in a group of virtual construct intervals at the same attribute value (Col. 10, lines 50 – 55, Reiner¹³) and ending said virtual construct intervals in said group of virtual construct intervals at different attribute values (Col. 9, lines 17 – 28, Reiner¹⁴).

Regarding Claim 20, Reiner discloses a method, wherein said process of inserting said predicate intervals into said virtual construct intervals, comprises inserting

¹¹ Wherein examiner interprets the step of appending partition-matching predicates as a step of inserting predicate intervals into the same sized virtual construct claimed. In other words, matching the partitions implies matching the size.

¹² Examiner interprets the pointer to the bitmap as an ID bitmap vector claimed. Reiner further discloses that this pointer is used to indicate which buffers are full. This implies the step of locating.

¹³ Wherein same key value corresponds to same attribute value claimed. In addition, the step of simultaneously indexing in accord to the same key value corresponds to beginning the predicates at the same attribute value claimed.

¹⁴ The two queries, before insertion and after insertion of predicates (disclosed by Reiner), begin with the same attribute values, such as, "SELECT name". Regarding the same citation, Reiner discloses ending the two queries at different attribute values, such as, "WHERE department" and "employee.rowid<0.0.2"

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said predicate interval into the same sized virtual construct interval (Col. 13, lines 55 – 57, Reiner¹⁵).

Regarding Claim 22, Reiner discloses a method, wherein event values of said predicate intervals are aligned with the same event values of said virtual construct intervals, such that the same event values of multiple predicate intervals are inserted into the same event value within virtual construct interval (Col. 9, lines 36 – 39, Reiner¹⁶).

Regarding Claim 23, Reiner discloses a method for maintaining and using a query index, wherein queries within said query index have predicate intervals, said method comprising:

defining groups of virtual construct intervals (Col. 2 and 8, lines 65 – 67 and 37 – 40; respectively, Reiner);

inserting each of said predicate intervals into at least one of said groups of said virtual construct intervals (Col. 9, lines 12 – 13 and 27 – 28, Reiner),

wherein all of said groups of said virtual construct intervals within said query index have the same pattern of different sized of virtual construct intervals (Col. 4 and 25, lines 34 – 37 and 39 – 40; respectively, Reiner),

¹⁵ Wherein examiner interprets the step of appending partition-matching predicates as a step of inserting predicate intervals into the same sized virtual construct claimed. In other words, matching the partitions implies matching the size.

¹⁶ Wherein examiner interprets the step of aligning with the same event values as the step of appending a predicate for matching records claimed.

wherein each of said groups of virtual construct intervals is adapted to hold multiple predicate intervals (Col. 2, lines 66 – 67, Reiner), and wherein each of said groups of virtual construct intervals covers a unique group of event values (Col. 44, lines 1 – 2 and 7 – 10, Reiner),

wherein said inserting of said predicate values comprises inserting said predicate intervals only into said construct intervals that have corresponding event values (Col. 13, lines 55 – 57, Reiner¹⁷), and

wherein said defining process only defines virtual construct intervals that are between the minimum and maximum possible attribute values of said predicate intervals (Col. 9 – 10 and 13, lines 67 and 1 – 2, and 43 – 45; respectively, Reiner) .

Regarding Claim 24, Reiner discloses a method, further comprising maintaining locations of said predicate intervals within said groups of virtual construct intervals using a predicate ID bitmap vector (Col. 63, lines 36 – 38, Reiner¹⁸).

Regarding Claim 25, Reiner discloses a method, wherein said process of defining said groups of virtual construct intervals comprises beginning all virtual construct intervals in a group of virtual construct intervals at the same attribute value

¹⁷ Wherein examiner interprets the step of appending partition-matching predicates as a step of inserting predicate intervals into the same sized virtual construct claimed. In other words, matching the partitions implies matching the size.

¹⁸ Examiner interprets the pointer to the bitmap as an ID bitmap vector claimed. Reiner further discloses that this pointer is used to indicate which buffers are full. This implies the step of locating.

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(Col. 10, lines 50 – 55, Reiner¹⁹) and ending said virtual construct intervals in said group of virtual construct intervals at different attribute values (Col. 9, lines 17 – 28, Reiner²⁰).

Regarding Claim 27, Reiner discloses a method, wherein said process of inserting said predicate intervals into said virtual construct intervals, comprises inserting said predicate interval into the same sized virtual construct interval (Col. 13, lines 55 – 57, Reiner²¹).

Regarding Claim 29, Reiner discloses a method, wherein event values of said predicate intervals are aligned with the same event values of said virtual construct intervals, such that the same event values of multiple predicate intervals are inserted into the same event value within virtual construct interval (Col. 9, lines 36 – 39, Reiner²²).

Regarding Claim 30, Reiner discloses a service adapted to maintains and use a query index, wherein queries within said query index have predicate intervals, said service:

¹⁹ Wherein same key value corresponds to same attribute value claimed. In addition, the step of simultaneously indexing in accord to the same key value corresponds to beginning the predicates at the same attribute value claimed.

²⁰ The two queries, before insertion and after insertion of predicates (disclosed by Reiner), begin with the same attribute values, such as, "SELECT name". Regarding the same citation, Reiner discloses ending the two queries at different attribute values, such as, "WHERE department" and "employee.rowid<0.0.2"

²¹ Wherein examiner interprets the step of appending partition-matching predicates as a step of inserting predicate intervals into the same sized virtual construct claimed. In other words, matching the partitions implies matching the size.

²² Wherein examiner interprets the step of aligning with the same event values as the step of appending a predicate for matching records claimed.

defining groups of virtual construct intervals (Col. 2 and 8, lines 65 – 67 and 37 – 40; respectively, Reiner); and

inserting each of said predicate intervals into at least one of said groups of said virtual construct intervals (Col. 9, lines 12 – 13 and 27 – 28, Reiner),

wherein all of said groups of said virtual construct intervals within said query index have the same pattern of different sized of virtual construct intervals (Col. 4 and 25, lines 34 – 37 and 39 – 40; respectively, Reiner),

wherein each of said groups of virtual construct intervals is adapted to hold multiple predicate intervals (Col. 2, lines 66 – 67, Reiner), and

wherein each of said groups of virtual construct intervals covers a unique group of event values (Col. 44, lines 1 – 2 and 7 – 10, Reiner), and wherein said inserting of said predicate values comprises inserting said predicate intervals only into said construct intervals that have corresponding event values (Col. 13, lines 55 – 57, Reiner²³).

Regarding Claim 31, Reiner discloses a service, further comprising maintaining locations of said predicate intervals within said groups of virtual construct intervals using a predicate ID bitmap vector (Col. 63, lines 36 – 38, Reiner²⁴).

²³ Wherein examiner interprets the step of appending partition-matching predicates as a step of inserting predicate intervals into the same sized virtual construct claimed. In other words, matching the partitions implies matching the size.

²⁴ Examiner interprets the pointer to the bitmap as an ID bitmap vector claimed. Reiner further discloses that this pointer is used to indicate which buffers are full. This implies the step of locating.

Regarding Claim 32, Reiner discloses a service, wherein said process of defining said groups of virtual construct intervals comprises beginning all virtual construct intervals in a group of virtual construct intervals at the same attribute value (Col. 10, lines 50 – 55, Reiner²⁵) and ending said virtual construct intervals in said group of virtual construct intervals at different attribute values (Col. 9, lines 17 – 28, Reiner²⁶).

Regarding Claim 34, Reiner discloses a service, wherein said process of inserting said predicate intervals into said virtual construct intervals, comprises inserting said predicate interval into the same sized virtual construct interval (Col. 13, lines 55 – 57, Reiner²⁷).

Regarding Claim 36, Reiner discloses a service, wherein event values of said predicate intervals are aligned with the same event values of said virtual construct intervals, such that the same event values of multiple predicate intervals are inserted into the same event value within virtual construct interval (Col. 9, lines 36 – 39, Reiner²⁸).

²⁵ Wherein same key value corresponds to same attribute value claimed. In addition, the step of simultaneously indexing in accord to the same key value corresponds to beginning the predicates at the same attribute value claimed.

²⁶ The two queries, before insertion and after insertion of predicates (disclosed by Reiner), begin with the same attribute values, such as, "SELECT name". Regarding the same citation, Reiner discloses ending the two queries at different attribute values, such as, "WHERE department" and "employee.rowid<0.0.2"

²⁷ Wherein examiner interprets the step of appending partition-matching predicates as a step of inserting predicate intervals into the same sized virtual construct claimed. In other words, matching the partitions implies matching the size.

²⁸ Wherein examiner interprets the step of aligning with the same event values as the step of appending a predicate for matching records claimed.

Regarding Claim 37, Reiner discloses a system for maintaining and using a query index, wherein queries within said query index have predicate intervals, said system comprising:

a plurality of bitmap vectors which define groups of virtual construct intervals;
a predicate insertion handler adapted to insert each of said predicate intervals into at least one of said groups of said virtual construct intervals (Col. 9, lines 12 – 13 and 27 – 28, Reiner),

wherein all of said groups of said virtual construct intervals have the same pattern of different sized of virtual construct intervals (Col. 4 and 25, lines 34 – 37 and 39 – 40; respectively, Reiner),

wherein each of said groups of virtual construct intervals is adapted to hold multiple predicate intervals (Col. 2, lines 66 – 67, Reiner), and

wherein each of said groups of virtual construct intervals covers a unique group of event values (Col. 44, lines 1 – 2 and 7 – 10, Reiner), and wherein said inserting of said predicate values comprises inserting said predicate intervals only into said construct intervals that have corresponding event values (Col. 13, lines 55 – 57, Reiner²⁹).

²⁹ Wherein examiner interprets the step of appending partition-matching predicates as a step of inserting predicate intervals into the same sized virtual construct claimed. In other words, matching the partitions implies matching the size.

Regarding Claim 38, Reiner discloses a system, further comprising a predicate ID bitmap vector adapted to maintain locations of said predicate intervals within said groups of virtual construct intervals (Col. 63, lines 36 – 38, Reiner³⁰).

Regarding Claim 40, Reiner discloses a system, wherein all of said groups of said virtual construct intervals have the same pattern of different sized of virtual construct intervals (Col. 4 and 25, lines 34 – 37 and 39 – 40; respectively, Reiner).

Regarding Claim 41, Reiner discloses a system, wherein said predicate insertion handler inserts said predicate intervals into the same sized virtual construct intervals (Col. 13, lines 55 – 57, Reiner³¹).

Regarding Claim 43, Reiner discloses a system, wherein event values of said predicate intervals are aligned with the same event values of said virtual construct intervals, such that the same event values of multiple predicate intervals are inserted into the same event value within virtual construct interval (Col. 9, lines 36 – 39, Reiner³²).

³⁰ Examiner interprets the pointer to the bitmap as an ID bitmap vector claimed. Reiner further discloses that this pointer is used to indicate which buffers are full. This implies the step of locating.

³¹ Wherein examiner interprets the step of appending partition-matching predicates as a step of inserting predicate intervals into the same sized virtual construct claimed. In other words, matching the partitions implies matching the size.

³² Wherein examiner interprets the step of aligning with the same event values as the step of appending a predicate for matching records claimed.

Regarding Claim 44, Reiner discloses a program storage device readable by machine, tangibly embodying a program of instructions executable by the machine to perform a method for maintaining and using a query index, wherein queries within said query index have predicate intervals, said method comprising:

defining groups of virtual construct intervals (Col. 2 and 8, lines 65 – 67 and 37 – 40; respectively, Reiner); and

inserting each of said predicate intervals into at least one of said groups of said virtual construct intervals (Col. 9, lines 12 – 13 and 27 – 28, Reiner),

wherein said process of inserting said predicate intervals into said virtual construct intervals, comprises inserting said predicate interval into the same sized virtual construct interval (Col. 13, lines 55 – 57, Reiner³³),

wherein each of said groups of virtual construct intervals is adapted to hold multiple predicate intervals (Col. 2, lines 66 – 67, Reiner), and

wherein said groups of virtual construct intervals have uniform lengths (Col. 25, lines 44 – 47, Reiner), and

wherein said predicate intervals have non-uniform lengths (Col. 25, lines 39 – 40, Reiner).

Regarding Claim 45, Reiner discloses a program storage device, wherein said method further comprises maintaining locations of said predicate intervals within said

³³ Wherein examiner interprets the step of appending partition-matching predicates as a step of inserting predicate intervals into the same sized virtual construct claimed. In other words, matching the partitions implies matching the size.

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groups of virtual construct intervals using a predicate ID bitmap vector (Col. 63, lines 36 – 38, Reiner³⁴).

Regarding Claim 46, Reiner discloses a program storage device, wherein said process of defining said groups of virtual construct intervals comprises beginning all virtual construct intervals in a group of virtual construct intervals at the same attribute value (Col. 10, lines 50 – 55, Reiner³⁵) and ending said virtual construct intervals in said group of virtual construct intervals at different attribute values (Col. 9, lines 17 – 28, Reiner³⁶).

Regarding Claim 47, Reiner discloses a program storage device, wherein all of said groups of said virtual construct intervals within said query index have the same pattern of different sized of virtual construct intervals (Col. 4 and 25, lines 34 – 37 and 39 – 40; respectively, Reiner).

Regarding Claim 50, Reiner discloses a program storage device, wherein event values of said predicate intervals are aligned with the same event values of said virtual construct intervals, such that the same event values of multiple predicate intervals are

³⁴ Examiner interprets the pointer to the bitmap as an ID bitmap vector claimed. Reiner further discloses that this pointer is used to indicate which buffers are full. This implies the step of locating.

³⁵ Wherein same key value corresponds to same attribute value claimed. In addition, the step of simultaneously indexing in accord to the same key value corresponds to beginning the predicates at the same attribute value claimed.

³⁶ The two queries, before insertion and after insertion of predicates (disclosed by Reiner), begin with the same attribute values, such as, "SELECT name". Regarding the same citation, Reiner discloses ending the two queries at different attribute values, such as, "WHERE department" and "employee.rowid<0.0.2"

inserted into the same event value within virtual construct interval (Col. 9, lines 36 – 39, Reiner³⁷).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

³⁷ Wherein examiner interprets the step of aligning with the same event values as the step of appending a predicate for matching records claimed.

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10. Claim 7, 14, 21, 28, 35, 42, and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reiner et al. (Reiner hereinafter) (US Patent No. 6,289,334 B1, issued: September 11, 2001) in view of Jagadish et al. (Jagadish hereinafter) (US Patent No. 7,010,522 B1, filed: June 17, 2002).

Regarding Claim 7, Reiner discloses all the limitations as disclosed above including length of predicate intervals (Col. 64, lines 32 – 35, Reiner) and inserting portions of predicate intervals into virtual construct intervals (Col. 9, lines 12 – 13 and 27 – 28, Reiner). However, Reiner is silent with respect to a method that determines if a predicate is larger than any of the virtual construct intervals. On the other hand, Jagadish discloses a method for inserting predicate intervals that comprises: inserting an initial portion of said predicate interval into the largest available virtual construct interval (Col. 5, lines 22 – 27 and 37 – 39, Jagadish³⁸), wherein a length in excess of a length of said initial portion of said predicate interval comprises a remnant predicate interval (Col. 5, lines 42 – 43, Jagadish³⁹); and inserting the remnant predicate interval into the same length virtual construct interval (Col. 5, lines 32 – 34 and 37 – 39, Jagadish). It would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the Jagadish's teachings to the system of Reiner. Skilled artisan would have been motivated to do so, as suggested by Jagadish (Col. 2, lines 6 – 7 and 29 – 31, Jagadish), to be able to efficiently find all strings approximately

³⁸ Examiner interprets the chopped Q pieces, disclosed by Jagadish, as the portions of predicate intervals claimed.

³⁹ The step of truncating the piece of query of length longer than q, implies that there is excess length of the predicates.

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containing a given query substring from a large collection of strings by using all (or part) of overlapping pieces. In addition, both of the references (Reiner and Jagadish) teach features that are directed to analogous art and they are directed to the same field of endeavor, such as, databases management systems and indexing queries. This close relation between both of the references highly suggests an expectation of success.

Regarding Claim 14, the combination of Reiner in view of Jagadish discloses a method, wherein if a predicate interval is larger than any of said virtual construct intervals, said inserting process comprises:

inserting an initial portion of said predicate interval into the largest available virtual construct interval (Col. 9, lines 12 – 13 and 27 – 28, Reiner; and Col. 5, lines 22 – 27 and 37 – 39, Jagadish⁴⁰), wherein a length in excess of a length of said initial portion of said predicate interval comprises a remnant predicate interval (Col. 5, lines 42 – 43, Jagadish⁴¹); and

inserting the remnant predicate interval into the same length virtual construct interval (Col. 5, lines 32 – 34 and 37 – 39, Jagadish).

Regarding Claim 21, the combination of Reiner in view of Jagadish discloses a method, wherein if a predicate interval is larger than any of said virtual construct intervals, said inserting process comprises:

⁴⁰ Examiner interprets the chopped Q pieces, disclosed by Jagadish, as the portions of predicate intervals claimed.

⁴¹ The step of truncating the piece of query of length longer than q, implies that there is excess length of the predicates.

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inserting an initial portion of said predicate interval into the largest available virtual construct interval (Col. 9, lines 12 – 13 and 27 – 28, Reiner; and Col. 5, lines 22 – 27 and 37 – 39, Jagadish⁴²), wherein a length in excess of a length of said initial portion of said predicate interval comprises a remnant predicate interval (Col. 5, lines 42 – 43, Jagadish⁴³); and

inserting the remnant predicate interval into the same length virtual construct interval (Col. 5, lines 32 – 34 and 37 – 39, Jagadish).

Regarding Claim 28, the combination of Reiner in view of Jagadish discloses a method, wherein if a predicate interval is larger than any of said virtual construct intervals, said inserting process comprises:

inserting an initial portion of said predicate interval into the largest available virtual construct interval (Col. 9, lines 12 – 13 and 27 – 28, Reiner; and Col. 5, lines 22 – 27 and 37 – 39, Jagadish⁴⁴), wherein a length in excess of a length of said initial portion of said predicate interval comprises a remnant predicate interval (Col. 5, lines 42 – 43, Jagadish⁴⁵); and

inserting the remnant predicate interval into the same length virtual construct interval (Col. 5, lines 32 – 34 and 37 – 39, Jagadish).

⁴² Examiner interprets the chopped Q pieces, disclosed by Jagadish, as the portions of predicate intervals claimed.

⁴³ The step of truncating the piece of query of length longer than q, implies that there is excess length of the predicates.

⁴⁴ Examiner interprets the chopped Q pieces, disclosed by Jagadish, as the portions of predicate intervals claimed.

⁴⁵ The step of truncating the piece of query of length longer than q, implies that there is excess length of the predicates.

Regarding Claim 35, the combination of Reiner in view of Jagadish discloses a service, wherein if a predicate interval is larger than any of said virtual construct intervals, said inserting process comprises:

inserting an initial portion of said predicate interval into the largest available virtual construct interval (Col. 9, lines 12 – 13 and 27 – 28, Reiner; and Col. 5, lines 22 – 27 and 37 – 39, Jagadish⁴⁶), wherein a length in excess of a length of said initial portion of said predicate interval comprises a remnant predicate interval (Col. 5, lines 42 – 43, Jagadish⁴⁷); and

inserting the remnant predicate interval into the same length virtual construct interval (Col. 5, lines 32 – 34 and 37 – 39, Jagadish).

Regarding Claim 42, the combination of Reiner in view of Jagadish discloses a system, wherein if a predicate interval is larger than any of said virtual construct intervals, said predicate insertion handler:

inserts an initial portion of said predicate interval into the largest available virtual construct interval (Col. 9, lines 12 – 13 and 27 – 28, Reiner; and Col. 5, lines 22 – 27, and 37 – 39, Jagadish⁴⁸), wherein a length in excess of a length of said initial portion of

⁴⁶ Examiner interprets the chopped Q pieces, disclosed by Jagadish, as the portions of predicate intervals claimed.

⁴⁷ The step of truncating the piece of query of length longer than q, implies that there is excess length of the predicates.

⁴⁸ Examiner interprets the chopped Q pieces, disclosed by Jagadish, as the portions of predicate intervals claimed.

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said predicate interval comprises a remnant predicate interval (Col. 5, lines 42 – 43, Jagadish⁴⁹); and

inserts the remnant predicate interval into the same length virtual construct interval (Col. 5, lines 32 – 34 and 37 – 39, Jagadish).

Regarding Claim 49, the combination of Reiner in view of Jagadish discloses a program storage device, wherein if a predicate interval is larger than any of said virtual construct intervals, said inserting process comprises:

inserting an initial portion of said predicate interval into the largest available virtual construct interval (Col. 9, lines 12 – 13 and 27 – 28, Reiner; and Col. 5, lines 22 – 27 and 37 – 39, Jagadish⁵⁰), wherein a length in excess of a length of said initial portion of said predicate interval comprises a remnant predicate interval (Col. 5, lines 42 – 43, Jagadish⁵¹); and

inserting the remnant predicate interval into the same length virtual construct interval (Col. 5, lines 32 – 34 and 37 – 39, Jagadish).

⁴⁹ The step of truncating the piece of query of length longer than q, implies that there is excess length of the predicates.

⁵⁰ Examiner interprets the chopped Q pieces, disclosed by Jagadish, as the portions of predicate intervals claimed.

⁵¹ The step of truncating the piece of query of length longer than q, implies that there is excess length of the predicates.

Response to Arguments

1. Applicant argues that the prior art fails to disclose; “all of said groups of said virtual construct intervals have the same pattern of different sized of virtual construct intervals”.

Examiner respectfully disagrees. Reiner does disclose that all of said groups of said virtual construct intervals have the same pattern of different sized of virtual construct intervals (Col. 4 and 25, lines 34 – 37 and 39 – 40; respectively, Reiner). Wherein the database partitions corresponds to the groups of virtual construct intervals claimed; wherein being equal in size corresponds to the same pattern claimed; and wherein the partition skew, which defines a distribution of data of unequal sized (Col. 25, lines 39 – 40, Reiner), corresponds to the different sized of virtual construct intervals claimed. Furthermore, Reiner further details groups of virtual construct intervals that have the same pattern (Col. 26, lines 60 – 64, these sub queries must have ... the same index blocks, Reiner).

2. Applicant argues that the prior art fails to disclose; “predefining a set of virtual construct intervals for decomposition”.

Examiner respectfully disagrees. The limitation including “predefining” and “decomposition” has not been disclosed in the original and/or amended claim language.

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However, the applied art does disclose such step of predefining (Col. 37, lines 53 – 58, Reiner).

3. Applicant argues that the prior art fails to disclose; “no combination of Reiner and Jagadish would teach the invention defined by the independent claims 1, 9, 16, 23, 30, 37, and 44”.

Examiner respectfully disagrees. The Reiner reference does teach the limitations defined by claims 1 – 4, 6, 8 – 11, 13, 15 – 18, 20, 22 – 25, 27, 29, 30 – 32, 34, 36 – 38, 40 – 41, 43 – 47, and 50 (See 102 rejections discussed in this Office Action, and response to argument 1) above). Furthermore, the combination of Reiner in view of Jagadish not only suggests but also teach the limitations defined by claims 7, 14, 21, 28, 35, 42, and 49 (See 103 rejections discussed in this Office Action above).

Conclusion

1. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

2. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Prior Art Made Of Record

1. Reiner et al. (US Patent No. 6,289,334 B1, issued: September 11, 2001) discloses an apparatus and method for recomposing database queries for database management system including multiprocessor digital data processing system.
2. Jagadish et al. (US Patent No. 7,010,522 B1, filed: June 17, 2002) discloses a method of performing approximate substring indexing.
3. Antoshenkov (US Patent No. 5,664,172) discloses a range-based query optimizer.

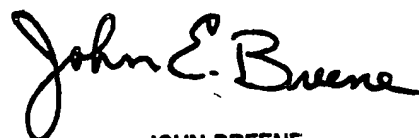
Points Of Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Giovanna Colan whose telephone number is (571) 272-2752. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Breene can be reached on (571) 272-4107. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Giovanna Colan
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